

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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Federal Communications Commission
Office of Secretary

In the Matter of)

Replacement of Part 90 by Part 88 to)
Revise the Private Land Mobile Radio)
Services and Modify the Policies)
Governing Them)

and)

Examination of Exclusivity and)
Frequency Assignment Policies of the)
Private Land Mobile Radio Services)

PR Docket No. 92-235

COMMENTS OF MOTOROLA

Motorola hereby submits these comments in response to the petitions for reconsideration and clarification of the FCC's *Second Report and Order* in the above captioned proceeding.¹

I. INTRODUCTION

The *Second Report and Order* of the private land mobile Refarming proceeding focused on three main issues. The first involved the consolidation of the various radio services that now exist under Part 90 of the Commission's Rules. The second concerned the use of trunking technology on frequencies below 800 MHz, while the third addressed the transition plan to convert low power itinerant frequencies in the 450 MHz band to high power use. Motorola's comments are limited to the implementation of trunking in the refarming bands and, to a lesser extent, the continued validity of the "safe harbor" antenna height and power tables which was raised in a few petitions.²

¹ *Second Report and Order*, PR Docket No. 92-235, FCC 97-61 (released March 12, 1997) [hereinafter *Second Report and Order* or *Order*].

² Regarding the low power transition issue, Motorola fully participated in the development of the position prepared by the Land Mobile Communications Council ("LMCC"). See LMCC Letter to Dan Phythyon, PR Docket 92-235, submitted June 4, 1997.

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The basic purpose of trunking technology is to provide users access to a number of available frequencies and route those users to an idle channel when a communication is necessary. In theory, access to multiple channels will reduce the probability that any single message would be blocked by the existence of other co-channel communications. Originally developed for frequency bands above 800 MHz, private land mobile trunking protocols most often utilize a centralized control channel that monitors the activity of the system and assigns users to an available channel. If no channels are available when needed, users are placed in a queue and served in turn. The continuous operation of the control channel is not conducive to a shared spectrum environment where other, non-affiliated users may demand access to that particular frequency. Therefore, "centralized" trunking technology has not been routinely deployed in the frequency bands below 800 MHz that do not offer exclusive use of channels.³

The *Second Report and Order* addressed this issue and concluded that "[t]runked systems will allow PLMR licensees to construct systems which are more efficient than conventional systems" and decided that "rather than defer the issue until we reach a decision on exclusivity, we believe the public will benefit by allowing trunking on frequencies below 800 MHz now, provided certain conditions are met."⁴ As further explained in the *Order*, licensees would be permitted to "implement centralized trunked systems in the 150-174 MHz, 421-430 MHz, 450-470 MHz, and 470-512 MHz bands, provided that they (1) obtain the consent of all licensees whose service areas overlap a circle with a radius of 113 km (70 mi) from the trunked system's base station and whose operating frequency is 15 kHz or less removed from the operating frequency of a trunked system designed to operate on 25 kHz channels or 7.5 kHz or less removed from a 12.5

³ While the 470-512 MHz band does offer exclusive channel use in the 11 cities where this spectrum is available, *See* Section 90.313, the FCC's rules do not specifically permit the use of trunking technology in that band. Rule waivers have been granted on a case-by case basis to licensees that demonstrate exclusivity.

⁴ *Second Report and Order* at ¶57.

kHz trunked system or 3.75 kHz or less removed from a 6.25 kHz trunked system; and (2) comply with all frequency coordination requirements.”⁵ Once authorized, new licensees can be assigned the same channel as the trunked system only with the concurrence of the trunked system licensee.⁶

Thirteen parties filed petitions for clarification or reconsideration of the *Second Report and Order* and most addressed the rules for implementing trunking technology in the bands below 800 MHz.⁷ In general, most petitioning parties support the FCC’s decision to allow the use of trunking on these channels that have been assigned on a shared basis for decades. Most of the requested clarifications focus on reducing the administrative burdens on potential trunking applicants.

It is these proposed interpretations and modifications that Motorola would like to address. First, Motorola supports the proposed interpretations in the petitions intending to distinguish *centralized* trunking from *decentralized* trunking. Motorola believes that all methods of trunking should be permitted in the refarming bands provided that the systems are adequately coordinated. Second, Motorola agrees with the many commenters who argue that the coordination distance for co-channel concurrence for trunking systems is too great and should be reduced. While Motorola has great interest in ensuring that existing conventional systems do not receive excessive levels of interference from trunked systems,

⁵ *Id.* at ¶58 (footnote omitted).

⁶ *Id.* at ¶59.

⁷ See, e.g., Petition for Reconsideration by Ericsson, Inc. (*Ericsson Petition*), Petition for Clarification by UTC, The Telecommunications Association (*UTC Petition*), Petition for Reconsideration by American Mobile Telecommunications Association, Inc. (*AMTA Petition*), Petition for Clarification and/or Reconsideration by Industrial Telecommunications Association, Inc. (*ITA Petition*), Petition for Reconsideration of Manufacturers Radio Frequency Advisory Committee, Inc. (*MRFAC Petition*), Petition for Reconsideration by Small Business in Telecommunications (*SBT Petition*), Request for Clarification of the Personal Communications Industry Association (*PCIA Petition*) Petition for Partial Reconsideration and Request for Clarification of Kenwood Communications Corporation (*Kenwood Petition*).

requiring trunking applicants to acquire co-channel concurrence for distances greater than 70 miles is unnecessary.

Finally, on a separate issue, Motorola supports those proposals recommending that the FCC minimize the industry's reliance on the safe harbor antenna height and power tables. Other means of analysis should be available for those situations where the accuracy of the tables becomes questionable.

II. CENTRALIZED AND DECENTRALIZED TRUNKING

In permitting the use of centralized trunking technology in the refarming bands, the FCC loosely defined the concept as a system that "uses multiple channel pairs in conjunction with a computer which automatically assigns a user the first available channel or places the user in a queue to be served in turn."⁸ The Commission further noted that in a centralized trunking system computers assign frequencies without monitoring the channels for other co-channel usage of the channel not internal to the trunked system.⁹

This definition led some petitioning parties to seek clarification on the permitted uses of *decentralized* trunking technologies.¹⁰ AMTA, for example, asks the FCC to clarify its position on how monitoring is to be accomplished for decentralized systems and, specifically, requests that the Commission clarify that monitoring may be accomplished either at the repeater or the mobile/control station.¹¹ AMTA notes that the Rules do not specify how monitoring is to be accomplished and that certain decentralized trunking systems employ automatic monitoring capabilities at the repeater. AMTA argues that while

⁸ *Second Report and Order* at ¶56.

⁹ *Id.*

¹⁰ Decentralized trunking systems scan and monitor multiple channels to locate vacant channels. Since such systems satisfy the fundamental practice of shared frequency operation (*i.e.*, monitoring) they have been licensed in the refarming bands since the early 1990's. Most of these technologies perform channel monitoring at the mobile unit rather than the repeater.

¹¹ *AMTA Petition* at 3-5.

no monitoring mechanism will "absolutely prevent" interfering transmissions, automatic monitoring at the repeater offers the advantage of eliminating the possibility that a frustrated user will manually override a transmission in progress. In summary, AMTA recommends that the FCC maintain its current latitude in the Rules.

PCIA, however, expresses "concern" over the use of decentralized trunking technologies that monitor at the repeater and states that "the manner in which such equipment is utilized greatly impacts the protection afforded co-channel licensees."¹² PCIA notes that most repeater monitoring systems only monitor the traffic on the repeater output frequency and will therefore miss communications conducted solely on the mobile output frequency. In addition, PCIA notes that there are situations where co-channel repeater stations may have overlapping service areas, yet they cannot "hear" one another due to the specifics of the deployment. In summary, PCIA recommends that the Commission permit non-consensual trunking utilizing co-channel monitoring at the repeater, but that "such operations must be: 1) specifically licensed and coordinated for trunked operation, 2) limited to channels where co-channel users are also operating in a repeater mode, and 3) pursuant to a demonstration as discussed above with regard to the distances of co-channel repeaters."¹³

Motorola supports these petitions in that they would permit multiple designs of trunking technology. The operating environment in the refarming bands is fairly hostile and a wide variety of products is necessary to squeeze out every possible measure of efficient use. For some user groups, decentralized trunking technology will provide a valid

¹² PCIA Petition at 4-8.

¹³ PCIA Petition at 7. The discussion referred to by PCIA in the above passage would further confine non-consensual trunking with centralized monitoring to frequencies where the trunking applicant can demonstrate that the proposed trunked repeater is within the service area of the co-channel licensee's repeater, or that the trunked applicant's service area is beyond the co-channel licensee's service area. Alternatively, where the two service areas overlap, but the repeaters cannot "hear" each other, PCIA would require that the repeaters monitor the mobile transmit frequency as well.

solution for increasing performance and quality. Motorola therefore supports the interpretation requested by the *AMTA Petition* that would permit decentralized trunking technology to be authorized on a non-consensual basis provided that the equipment utilizes monitoring techniques *either at* the repeater station or the mobile/control station.

However, Motorola believes that PCIA is also correct in that such systems should be authorized only after they have been fully coordinated. Under some configurations, centralized monitoring techniques will not offer the same capabilities of a single channel conventional radio to ensure that the relevant frequency is free of co-channel traffic prior to transmission. Given that the trunked system likely will be able to provide service to more users, this will increase the probability of interference to existing users. Therefore, Motorola supports the recommendations of PCIA to require applicants for decentralized trunked systems to provide a showing along with their applications that analyzes whether their proposed stations would unduly affect nearby mobile-only (non-repeater) systems or other co-channel repeater operations.

Notwithstanding Motorola's desire to ensure that decentralized trunking systems are processed through the frequency coordination process, we firmly support technical neutrality in the FCC Rules to allow manufacturers to develop a broad range of products for the wide variety of private land mobile customers. The FCC should endeavor to eliminate unintentional technology bias so that users can choose from a variety of options to help solve their communications needs in these congested frequency bands.

III. AREA OF CONCURRENCE

The *Second Report and Order* conditioned the FCC's approval of centralized trunking systems on applicants acquiring the concurrence of affected existing users. As defined by the *Order*, potential trunking applicants must obtain the consent of all licensees whose service areas overlap a circle with a radius of 70 miles from the trunked system's base station and whose operating frequency is 15 kHz or less removed from the operating

frequency of a trunked system designed to operate on 25 kHz channels or 7.5 kHz or less removed from a 12.5 kHz trunked system or 3.75 kHz or less removed from a 6.25 kHz trunked system. Service areas are defined as 39 dBμ in the UHF bands and 37 dBμ in the VHF bands.

A number of petitions were filed arguing that this area of concurrence was too great and unnecessary to minimize potential co-channel interference. Ericsson, for example, recommends that, consistent with the rules for 800 MHz and 900 MHz, the trunking request concurrence mileage requirement provisions should be no more than 55 miles.¹⁴ The *Ericsson Petition* also argues that the requirement to allow trunking only when *all* co-channel and adjacent channel licensees within certain geographical areas concur is overly restrictive. Ericsson recommends that the FCC should require only the concurrence of licensees constituting a simple majority of the authorized co-channel and adjacent channel subscriber units.

AMTA agrees that the 70 mile coordination area is unnecessarily expansive and instead recommends that the FCC should require parties proposing trunking in the 450-512 MHz bands to obtain consent from those parties whose actual 39 dBμ service area is overlapped by the 22 dBμ interference contour of the proposed trunked facility.¹⁵ The *ITA Petition* offers a similar perspective noting that the FCC prerequisites are well intentioned but overly burdensome.¹⁶ ITA supports a plan where the candidate for trunking should have to demonstrate that it has obtained the concurrence of 1) all co-channel licensees whose interference contour (19 dBμ/150 MHz band, 21 dBμ/421-512 MHz band) overlaps the trunking candidate's service contour (37 dBμ/150 MHz band, 39 dBμ/421-512 MHz

¹⁴ *Ericsson Petition* at 3.

¹⁵ *AMTA Petition* at 10.

¹⁶ *ITA Petition* at 6.

band); and 2) all co-channel licensees whose service contour overlaps the trunking candidates' interference contour.

Motorola agrees with the basic thrust of these positions and urges the FCC to redesign the trunking area of concurrence accordingly. Requiring routine coordination and concurrence in excess of 70 miles is excessive and attempts to maintain a quality of service not now achieved in these congested frequency bands. After careful consideration, Motorola supports ITA's proposal which would simply require co-channel concurrence based on overlapping service contours and interference contours.¹⁷ As opposed to a straight mileage separation, this is a more precise method of ensuring that those stations that actually require interference protection are the stations being consulted on the deployment of the new trunked station. Further, it is no more burdensome than the FCC's approach which would also require trunking applicants to calculate service contours for stations beyond 70 miles from the trunked station. Finally, it provides trunking applicants the ability to reduce their area of concurrence by choosing to operate with less power at lower antenna heights. For these reasons, Motorola urges the FCC to adopt the procedure described by ITA.

Motorola agrees with the concerns expressed by Ericsson that requiring concurrence of *all* affected users may be creating too high of a hurdle for trunking applicants and would potentially encourage anti-competitive behavior.¹⁸ Motorola does not support, however, only requiring the concurrence of a simple majority of users on the frequency. This could omit too many existing users from the concurrence process and allow trunking applicants to ignore valid interference concerns. Motorola would instead

¹⁷ Motorola also supports defining the service and interference contours as the 39 dBμ contour and the 21 dBμ contour in the UHF bands and the 37 dBμ contour and the 19 dBμ contour in the VHF bands. The FCC previously proposed using these contours for this purpose. *Report and Order and Further Notice of Proposed Rule Making*, PR Docket No. 92-235, 10 FCC Rcd 10076 (1995) [*Refarming Report and Order*].

¹⁸ *Ericsson Petition* at 2.

prefer a higher percentage but less than unanimity (perhaps those users that represent at least 85 percent of the mobile units authorized on the channel). In the alternative, the FCC could retain the need for unanimous consent if it provides some mechanism for trunking applicants to object to unreasoned objections.

Finally, Motorola objects to the recommendation of Kenwood that adjacent channel concurrence not be required. The new channeling plans for the refarming spectrum assigns channels every 6.25 kHz while allowing varying bandwidth equipment. Thus, systems assigned to adjacent frequencies are actually co-channel in many instances. Motorola does not object to the definition of affected adjacent channel systems adopted in the *Second Report and Order* provided that the distance requirements for concurrence are reduced as discussed herein.

IV. THE SAFE HARBOR TABLES

Adopted earlier in this proceeding, the safe harbor tables are intended to provide users with the technical parameters (antenna height and power) to match accurately their intended service areas.¹⁹ Their intent is to avoid "over-engineering" and to ensure that users do not use more spectrum/geographical area than they indeed need. The *ITA Petition* argues that the "coverage areas provided for in the 'safe harbor' tables are not realistic."²⁰ ITA would prefer to analyze the proposed systems' service contours to determine whether the predicted service area conforms with the actual needs of the applicant.

Motorola was an early advocate of the safe harbor tables and believes that they serve a useful purpose for many applicants. In areas of non-extreme terrain elevations, the tables will provide most applicants with reasonable technical parameters without excessive analysis. However, the tables have proven to be defective for certain circumstances,

¹⁹ *Refarming Report and Order* at ¶69.

²⁰ *ITA Petition* at 14, 15.

particularly when the proposed system is locating on an elevated antenna site.²¹ Rather than eliminate the tables for all applications, the FCC should routinely allow the use of alternative showings that justify the requested antenna height and power combinations based on the service area needs of the applicant. In particular, the FCC should allow existing licensees modifying existing systems to obtain the necessary technical facilities in order to replicate the original coverage area.

V. CONCLUSION

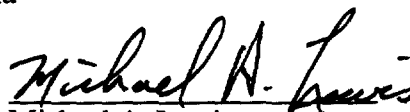
Motorola is excited about the possibilities that trunking offers to licensees in the refarming **bands**. By reducing the regulatory burdens on manufacturers and applicants, this **technology** can improve the level of service that private land mobile users experience in the **extremely** congested UHF and VHF frequency bands. Motorola urges the FCC to maintain a **rapid** pace in completing the refarming proceeding so that these results can more quickly be **realized**.

Respectfully submitted,

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²¹ The inaccuracy of the safe harbor tables at high elevations is due to the fact that they are based on the FCC's R-6602 propagation curves. The original LMCC curves used a more precise model (Okamura/Hata/Davidson).